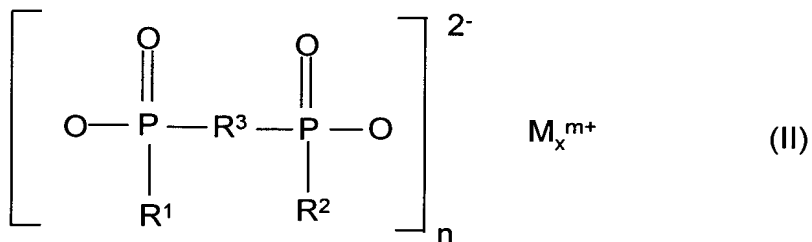
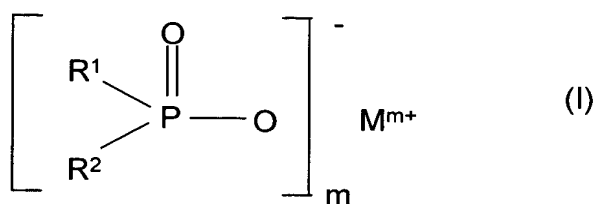


## Patent claims

2002DE121

1. A flame retardant combination comprising, as component A, a phosphinate of the formula (I) and/or a diphosphate of the formula (II) and/or polymers of these



where

$\text{R}^1$  and  $\text{R}^2$  are identical or different and are  $\text{C}_1$ - $\text{C}_6$ -alkyl, linear or branched, and/or aryl;

$\text{R}^3$  is  $\text{C}_1$ - $\text{C}_{10}$ -alkylene, linear or branched,  $\text{C}_6$ - $\text{C}_{10}$ -arylene, -alkylarylene or -arylalkylene;

M is calcium ions, magnesium ions, aluminum ions and/or zinc ions,

m is 2 or 3;

n is 1 or 3;

x is 1 or 2;

and comprising a component B1, B2 and/or B3 wherein

B1 is a salt of 1,3,5-triazine compound with polyphosphoric acid with a number average degree of condensation  $n$  is higher than 20 and with the melamine content amounting to more than 1.1 mole of melamine per mole of phosphorus atom, and a preferred pH of a 10 % slurry of that polyphosphate salt in water being higher than or equal to 4,5, wherein the preferred 1,3,5-triazine compounds are melam, melem, melon, especially melamine, or mixtures of these compounds, and

wherein B2 is a melamine polymetaphosphate having a solubility of from 0,01 to 0,10 g/100 ml in water at 25°C, a pH from 2.5 to 4.5 in the form of a 10 wt.% aqueous slurry at 25°C and a melamine content of from 1,0 to 1,1 mol per mol of phosphorus atom, wherein that component B2 is a melamine salt of a long-chain polyphosphoric acid represented by the formula (III)



wherein M is melamine, represented by the formula (IV)



H is a hydrogen atom, P is a phosphorus atom, and the degree ( $n$ ) of polymerization of said melamine salt of linear phosphoric acid is an integer of at least 20, and

wherein B3 is a composite salt of polyphosphoric acid with melamine, melam and/or melem having a solubility in water (25°C) of 0.01 to 0.10g/100ml, a pH of 4.0 to 7.0 as measured using a 10% by weight aqueous slurry (25°C), and melamine contents of 0.05 to 1.00 mol (preferably 0.05 to 0.40 mol), melam contents of 0.30 to 0.60 mol (preferably 0.30 to 0.60 mol) and melem contents of 0.05 to 0.80 mol (preferably 0.30 to 0.80 mol), respectively, per mol of phosphorus atoms.

2. A flame retardant combination as claimed in claim 1, wherein  $R^1$  and  $R^2$  are identical or different and are  $C_1$ - $C_6$ -alkyl, linear or branched and/or phenyl.
3. A flame retardant combination as claimed in claim 1 or 2, wherein  $R^1$  and  $R^2$  are identical or different and are methyl, ethyl, n-propyl, isopropyl, n-butyl, tert-butyl, n-pentyl and/or phenyl.
4. A flame retardant combination as claimed in one or more of claims 1 to 3, wherein  $R^3$  is methylene, ethylene, n-propylene, isopropylene, n-butylene, tert-butylene, n-pentylene, n-octylene or n-dodecylene.
5. A flame retardant combination as claimed in one or more of claims 1 to 3, wherein  $R^3$  is phenylene or naphthylene.
6. A flame retardant combination as claimed in one or more of claims 1 to 3, wherein  $R^3$  is methylphenylene, ethylphenylene, tert-butylphenylene, methylnaphthylene, ethylnaphthylene or tert-butylnaphthylene.
7. A flame retardant combination as claimed in one or more of claims 1 to 3, wherein  $R^3$  is phenylmethylene, phenylethylene, phenylpropylene or phenylbutylene.
8. A flame retardant combination as claimed in one or more of claims 1 to 7, wherein M is aluminum ions or zinc ions.
9. The use of a flame retardant combination as claimed in one or more of claims 1 to 8 for rendering thermoplastic polymers flame retardant, wherein the thermoplastic polymers are HIPS (high-impact polystyrene), polyphenylene ethers, polyamides, polyesters, polycarbonates or blends or polymer blends of the type ABS (acrylonitrile-butadiene-styrene) or PC/ABS (polycarbonate/acrylonitrile-butadiene-styrene) or PPE/HIPS (polyphenylene

ether/high-impact polystyrene), or polyamide, polyester or blends of PPE/HIPS.

10. The use of a flame retardant combination as claimed in claim 9, wherein each of the components A and B, independently of one another, is used at a concentration of from 1 to 30 preferably 3 to 20 % by weight, based on the plastic molding composition.

11. A flame-retardant plastic molding composition comprising a flame retardant combination as claimed in one or more of claims 1 to 8, where in the plastic is preferably a thermoplastic polymer selected from the type HIPS (high-impact polystyrene), polyphenylene ethers, polyamides, polyesters, polycarbonates or blends or polymer blends of the type ABS (acrylonitrile-butadiene-styrene) or PC/ABS (polycarbonate/acrylonitrile-butadiene-styrene) or PPE/HIPS (polyphenylene ether/high-impact polystyrene) plastics, or wherein the plastic is polyamides, polyesters or blends of PPE/HIPS.